

What is claimed is:

1. A holder for holding a tool on a longitudinal axis and with said tool having a shank with a recess, comprising:

a split collet disposed circumferentially about and being rotatable about said axis and having a body portion and fingers extending from said body portion and parallel to said axis and being radially movable relative to said axis and having an end distal from said body portion,

said body portion having a socket for reception of said tool shank and for transmitting rotational drive to said tool and about said axis,

a sleeve co-extensively surrounding said collet and being slidable on said collet along said axis and extending circumferentially over said tool shank recess and said fingers,

said fingers and said sleeve having mutually engagable camming surfaces for urging said fingers radially toward said axis upon sliding said sleeve in the direction of said distal end and thereby have said fingers radially clamp said tool,

a spring for urging said sleeve toward said distal end,

a detent ball on said sleeve adjacent said body portion and located to be disposed in said tool shank recess when said sleeve has urged said fingers radially inwardly,

a ball-engaging surface on said sleeve to be in contact with said ball in a first axial position of said sleeve to position said ball into said tool shank recess and thereby hold said tool against movement along said axis and said sleeve having a relief located to receive said ball in a second axial position of said sleeve and thereby release said ball from said tool shank recess, and

the axially spaced-apart relative location of said camming surfaces when in contact with each other and that of said ball engaging surface being such that said camming surfaces are rotationally clamping said tool when said ball engaging surface has positioned said ball in said recess.

2. A holder for holding a tool on a longitudinal axis and with said tool having a shank with a recess, comprising:

a split collet disposed circumferentially about and being rotatable about said axis and having a body portion and fingers extending parallel to said axis and being radially movable relative to said axis and having an end distal from said body portion,

said body portion having a socket for reception of said tool shank and for transmitting rotational drive to said tool and about said axis,

a sleeve co-extensively surrounding said collet and being slidable on said collet along said axis and extending circumferentially over said tool shank recess and said fingers,

a spring for sliding said sleeve toward said distal end, said fingers and said sleeve having mutually engagable camming surfaces for urging said fingers radially toward said axis upon sliding said sleeve in the direction of said distal end and thereby have said fingers radially clamp said tool,

a detent ball on said sleeve adjacent said body portion and located to be disposed in said tool shank recess when said sleeve has urged said fingers radially inwardly,

a ball-engaging surface on said sleeve to be in contact with said ball in one axial position of said sleeve to position said ball into said tool shank recess and thereby hold said tool against movement along said axis and said sleeve having a relief located to receive said ball in a second axial position of said sleeve and thereby release said ball from said tool shank recess, and

the relative locations along said axis of said camming surfaces and said ball engaging surface and said detent ball are such that axial movement of said sleeve toward said distal end results in said camming surfaces clamping said tool, for stabilizing said tool, when said detent ball is positioned by said ball engaging surface in said shank recess for axial restraint of said tool.

3. The holder for holding a tool as claimed in claim 2, including:

said holder has a stop engagable with said tool for setting the axial positioning of said tool along said axis.

4. A holder for holding a tool on a longitudinal axis and with said tool having a shank with a recess therein, comprising:

a split collet disposed circumferentially about and being rotatable about said axis and having a body portion and fingers extending parallel to said axis and being radially movable relative to said axis and having an end distal from said body portion,

said body portion having a socket for reception of said tool shank,

a sleeve co-extensively surrounding said collet and being slidable on said collet along said axis and extending circumferentially over said tool shank recess and said fingers,

a spring for urging sliding of said sleeve toward said distal end,

said fingers and said sleeve having mutually engagable camming surfaces for urging said fingers radially toward said axis upon sliding said sleeve in the direction of said distal end and thereby have said fingers radially clamp said tool,

a detent ball on said sleeve adjacent said body portion and located to be disposed in said tool shank recess when said sleeve has urged said fingers radially inwardly,

a ball engaging surface on said sleeve to be in contact with said ball in a first axial position of said sleeve to position said ball into said tool shank recess and thereby hold said tool against movement along said axis and said sleeve having a relief located to receive said ball in a second axial position of said sleeve and thereby release said ball from said tool shank recess,

the relative axial locations of said camming surfaces and said ball engaging surface and said detent ball are such that axial movement of said sleeve toward said distal end results in said camming surfaces clamping said tool and said ball engaging said shank recess, all for stabilizing said tool, and

said sleeve being telescopically slidable over said collet distal end of said fingers and said sleeve and said collet distal ends having slidably engagable surfaces for moving said finger distal ends radially inwardly upon sliding said sleeve over said collet to effect said clamping.

5. The holder for holding a tool as claimed in claim 4, wherein:

said slidable engagable surfaces are chamfers on both said sleeve and said fingers and which match each other.

6. The holder for holding a tool as claimed in claim 5, wherein:

said chamfer on said sleeve is faced radially inwardly and said chamfer on said fingers is faced radially outwardly.

7. A method of making a holder for a rotatable tool, comprising the steps of:

having a longitudinal axis and providing a collet with split fingers movable radially relative to said axis,

placing a cylindrical sleeve telescopically over said collet and having said sleeve slidable along said collet in the two axial directions along said axis after placing a detent and a spring between said collet and said sleeve, and

providing mutually engagable chamfers on said collet and said sleeve and telescopically sliding said sleeve onto said collet and engaging said chamfers with each other and thereby move said collet fingers radially inwardly to a position within said sleeve.

8. A method of making a tool holder with a longitudinal axis, for a rotatable tool which has a circular shank and an end wall and a recess spaced a distance from said end wall, including the steps of:

providing a collet centered on said axis and having clamping surfaces movable radially to said axis,

providing a sleeve for sliding along said axis and having a circular opening for axial movement of said sleeve over said collet,

providing mutually engagable camming surfaces on said collet and said sleeve for engagement upon axial movement of said sleeve on said collet and for positioning said clamping surfaces onto said tool,

interposing a detent between said shank and said sleeve and having a surface on said sleeve for engaging said detent for axially holding said tool,

interposing a spring between said collet and said sleeve for urging said collet and said sleeve in an axial direction along said axis,

forming chamfers on said collet and said sleeve for mutual engagement for effecting sliding telescoping assembly of said sleeve over said collet in response to said chamfers causing said clamping surfaces to flex radially inwardly, and

the respective locations along said axis of said tool recess and said detent and said sleeve surface and said clamping surfaces and said chamfers being such that upon the urging of said sleeve in said axial direction said tool is held by said holder.

9. In a tool holder for holding a tool on an axis and having a cylindrical collet with flexible fingers movable radially of said axis and a cylindrical sleeve telescopically slidable over said collet and camming surfaces interengagable on said collet and said sleeve for urging said collet into clamping relationship with said tool, the improvement

comprising:

said collet fingers and said sleeve each presenting a circular chamfer portion and with said chamfer portion on said collet fingers being on a diameter larger than the diameter of said chamfer portion of said sleeve when said collet is free of said sleeve, whereby sliding said sleeve over said collet interengages said chamfer portions and flexes said collet fingers radially toward said axis for telescoping said collet within said sleeve.